



REDS IN DANGER

Red squirrels have become locally extinct in many parts of the UK and are currently threatened in the rest of their English, Welsh, Irish and Scottish range. Luckily reds are still numerous in much of the rest of their range and so are not close to extinction on a global scale.

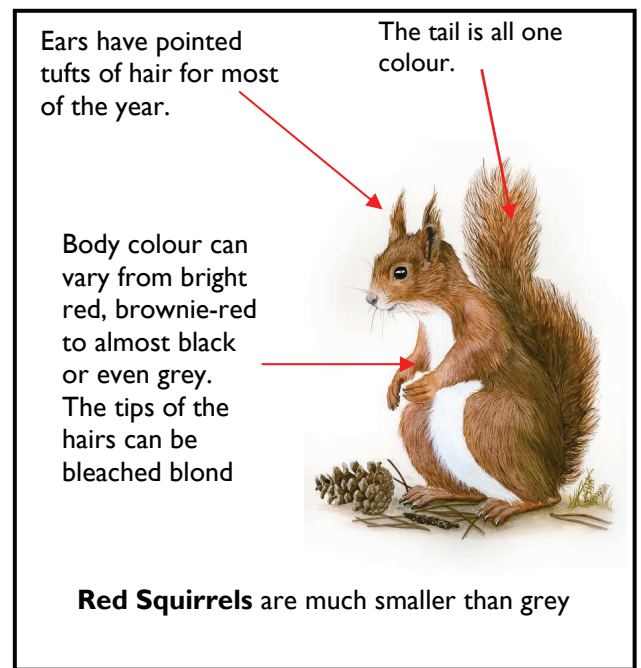
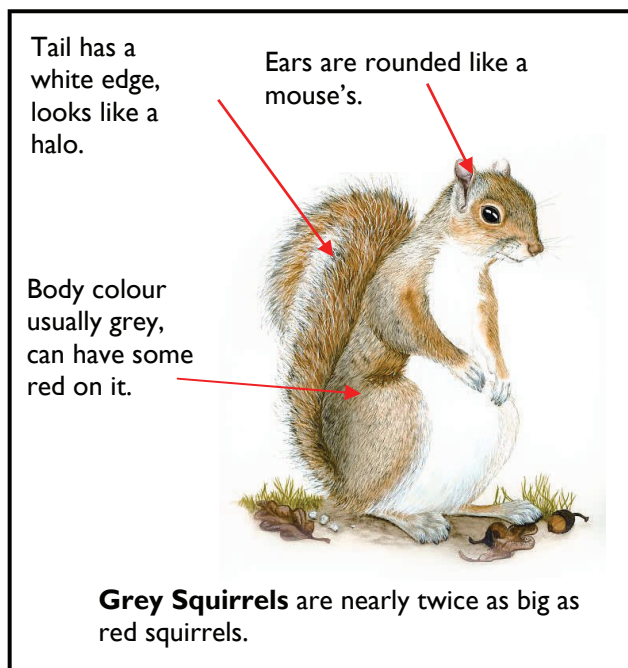
WHY ARE REDS THREATENED?

There are a number of reasons why red squirrels are in danger in the UK:-

1. Grey Squirrels – Competition and Virus Carriers

Though the red squirrel (*Sciurus vulgaris*) is the UK's only native squirrel, the grey squirrel (*Sciurus carolinensis*) – an introduction from North America – is more widespread in England and Wales and with approximately 2,500,000 of them, the grey is much more numerous throughout the whole country.

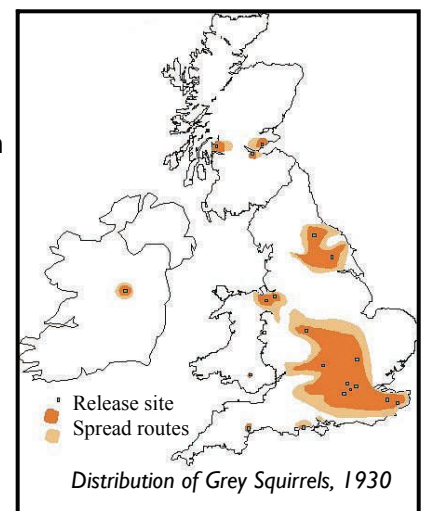
How to tell the differences between Red and Grey Squirrels



Grey History in the UK

The first recorded release of grey squirrels was in 1876, when a Mr Brocklehurst brought a pair over and released them into Hensbury Park in Cheshire. The most significant releases of greys, in terms of establishing the wild population include the release of 100 greys into Richmond Park, Surrey, in 1902, 91 into Regents Park between 1905 and 1907 and 10 into Woburn Park, Bedfordshire in 1890. There are documented records for grey releases to at least 30 sites in England and in Scotland over the next fifty years. Releasing greys in Britain was made illegal in about 1930.

From this handful of releases the grey squirrel spread rapidly throughout England, Wales and parts of southern Scotland usually displacing the red.





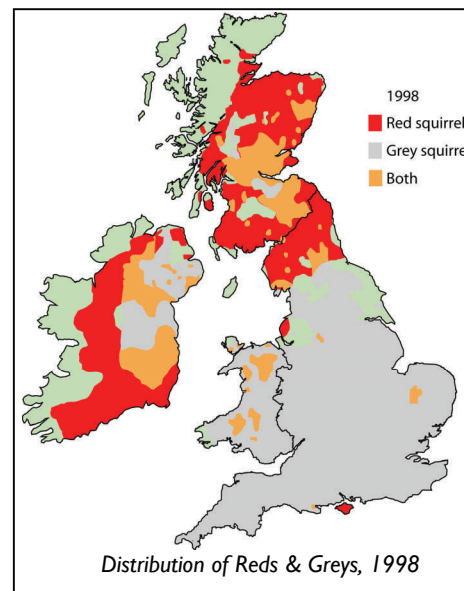
Grey squirrels have also been released in northern Italy and are starting to spread, resulting in a similar decrease in red squirrels. The research being undertaken in England, Scotland and Ireland into grey ecology and distribution is therefore of vital importance in helping control and prevent the grey squirrel spreading throughout the European mainland.

Greys vs. Reds

At first, people thought that the larger grey squirrels were aggressive towards the smaller red squirrels, effectively forcing them out. However, detailed scientific research is revealing a more complex story:-

Greys evolved in the broadleaved forests of North America alongside other types of squirrel and forest mammal and are used to competing with other squirrels for food and resources. Our native red evolved primarily in the boreal forests of Europe and Asia with little competition from other tree-dwelling mammals.

This table describes the factors that have led to grey squirrels replacing red squirrels in many parts of England.



Factor	Grey	Red	So What!
Size and habitat use relationship	<ul style="list-style-type: none"> • Larger and heavier. • Increases body weight by 17 - 23 % in autumn. • 14% of time in trees, rest on ground • Can cross distances on the ground of up to 2km with no trees. 	<ul style="list-style-type: none"> • Smaller & lighter • Increases body weight by 8 - 12% in autumn/winter. • 70% of time in trees. • Can cross up to 500m of open ground, but avoid doing so where possible. 	<ul style="list-style-type: none"> • Greys eat more food than reds. • Putting on more weight in autumn enables greys to survive a severe winter. • Greys can look in more areas for food, especially on the ground and away from trees. • Greys are less vulnerable than reds to habitat loss and isolation as well as food shortage, as can cross open ground. • Reds are adapted to live in trees so do well in conifers when the cones stay on the tree for much of the year. • Reds need protected corridors to move to new areas
Food Types and Nutrition	<ul style="list-style-type: none"> • Eats a wide range of broadleaf tree seeds, including oak, hazel and beech. Also eats flowers, leaf buds, mushrooms, bird eggs and invertebrates. • Eats some seeds when they are unripe, particularly hazel. • Particularly good at digesting acorns and obtaining nutrition from them. • Caches food. • Does less well in pure conifer forests as not enough nutrition. 	<ul style="list-style-type: none"> • Eats a wide variety of seeds from both broadleaf and conifer species. Also eats flowers, mushrooms, leaf buds, invertebrates and bird eggs. • Prefers ripe seeds. • Poor at digesting acorns and obtaining good nutrition from them. • Caches food. • Survive on smaller, lower energy seeds, including conifer seeds. • Variety of tree age is also important as conifers do not produce cones every year. 	<ul style="list-style-type: none"> • Many woodlands in England are dominated by oak trees, favouring the grey squirrel. • Reds survive better in conifer or mixed conifer/broadleaf forests, though grey squirrels can live in these forests. • Reds store little fat over winter and rely on cached food and seeds on trees. In forests with grey squirrels, greys have been shown to find and eat the reds' food caches leaving less for the reds to eat. • Breeding success of both grey and red females depends on food supplies. • Good autumn and winter food supplies mean more juvenile squirrels survive their first winter.



Factor	Grey	Red	So What!
Breeding success	<ul style="list-style-type: none"> • Females usually breed twice a year, rearing up to 6 kittens each time. • The heavier females are more likely to breed twice and wean their young successfully. 	<ul style="list-style-type: none"> • Females will only breed if they weigh more than 280g. • Females can breed twice in one year if they get enough food and are in good condition. • More likely to breed twice and wean young successfully if heavier and healthier. 	<ul style="list-style-type: none"> • Greys can take advantage of good seed years in autumn and put on more weight so they are healthier in the spring and the females more likely to breed. • Grey populations can increase rapidly in response to good food supplies. • Reds cannot put on a lot of excess weight, so need to cache food and find it later on to maintain their weight. • Red females need very good winter and spring food supplies to successfully breed twice in a year, this is less certain in conifer forests.
Number of squirrels per hectare in different forest types	<ul style="list-style-type: none"> • Broadleaf forests have between 2 and 8 greys/ha. • Conifer forests 0.15 – 4.9/ha 	<ul style="list-style-type: none"> • Broadleaf – 0.4 to 1.2 reds/ha • Conifer – 0.02 – 1.2 reds/ha • There is evidence that in broadleaf forests, with high proportion of beech, red squirrel densities can reach over 3/ha. 	<ul style="list-style-type: none"> • Greys can live at higher densities than reds in broadleaved woodlands. If reds and greys live in the same broadleaf woodland, the number of greys will increase faster than reds. Over time, reds will find it harder to find enough food and produce young. The young they do produce will have a greater struggle surviving. • As reds also find it hard to move from one woodland to another if there are no corridors, they eventually die out. • In pure conifer forests, reds can breed well and reach higher numbers than greys. But if there are some oak trees nearby, grey numbers are similar to reds. • Conifer trees do not produce cones every year so some years will have very few cones leading to a fall in numbers of squirrels the trees support. • Also most conifers are in plantations so
<ul style="list-style-type: none"> • Squirrel Poxvirus 	<ul style="list-style-type: none"> • Greys carry the Squirrel Poxvirus but do not get ill from it or die. 	<ul style="list-style-type: none"> • If they catch squirrel pox, reds will die within 2 weeks. • Treatment is possible for the virus if an infected squirrel is caught and treated quickly. 	<ul style="list-style-type: none"> • Squirrel poxvirus can quickly kill red squirrels but not grey squirrels. • It is probable that infected grey squirrels pass the virus onto reds. It is not known how the virus is transmitted but transmission probably requires either direct contact or indirect contact through faeces, urine and scent marking.



Habitat Changes 1914 to 1980

A lot of woodland and plantations were felled between 1914 and 1945, particularly those containing old growth Scots Pine and Norway Spruce, further forests have been felled since. In many areas, these forests were replaced with the fast growing Sitka Spruce, unfortunately this species is not favoured by red squirrels and cone production varies considerably from year to year. At this time, clearfelling and planting of new forests meant that most trees are the same age and will cone heavily in the same year. In other years they will hardly produce any cones, which means there is little food for the red squirrel.

The loss of hedgerows between the 1940s and 1980s added to the fragmentation of woodlands and meant that red squirrels in woodland could become completely isolated from nearby woods if there were no linking corridors. Grey squirrels could move over open land up to 1km and so could still disperse to new woodlands if there were food shortages or other problems in their existing woodland.



Clearfell of conifers. Photo D. Hutt

3. Persecution

Red squirrels have been protected by law in the UK since 1981 and it is illegal to intentionally injure, catch or kill them, disturb their dreys or cut down trees with dreys in them.

However, in the past, red squirrels were considered as pests in forests because they stripped the bark off young trees in plantations, often killing them. Between 1903 and 1933 the Highland Red Squirrel Club recorded that they killed 82,000 red squirrels.

4. Disease

Outbreaks of disease can result in red squirrel populations falling dramatically or becoming locally extinct. Main diseases include the squirrel poxvirus (SQPV) and coccidiosis, an intestinal parasite which can also be fatal.

SQPV is thought to have spread from the south of England, primarily being carried by the grey squirrels. Research has found that the rate of decline of the red squirrel is 17 – 25 times higher in areas where SQPV is found in grey squirrels. As yet, we do not know how this horrible disease passes from grey to red – though research is currently underway in Scotland to find out the method of transmission; a potential breakthrough in reducing the spread of SQPV.

We do know that red squirrels with the disease die within two weeks, unless they are found and treated by vets in the first week or so of the illness.



A red squirrel with typical squirrel pox lesions on its eyes, ears and mouth.

Photo: Corrie Bruemmer



The South of Scotland holds the largest red squirrel population in the UK and until recently there were no records of grey squirrels testing positive for the SQPV antibodies. Unfortunately, by the summer of 2006, at least 30 culled greys were found to be seropositive in the south-west of Scotland. There is a real concern that more SQPV grey squirrels will move into north Scotland from Northumberland and Cumbria, resulting in transmission of the disease to the Scottish grey population, which would be devastating for the red squirrels there.

The greatest area of concern is greys travelling along river and other wildlife corridors from Cumbria into Dumfries and Galloway.



*This squirrel is still alive and has severe lesions around its mouth, eyes and ears.
Photo: Corrie Bruemmer.*

5. Predators

Natural predators of squirrels include foxes, pine martens and birds of prey such as buzzards and goshawks. Pet cats and even dogs are known to kill squirrels in gardens, particularly if squirrels have to cross open ground in order to reach feeders.

6. Road Kills

A number of red squirrels are killed on roads each year, particularly on smaller, less well used country roads where there is woodland on either side of the road. The squirrels are sometimes run over by cars as they cross from one woodland to the next. A particular hazard is when people provide food in their gardens across a road from an area of woodland. The squirrels then learn where the food is and regularly cross the road to eat, thus becoming vulnerable to traffic

7. Blow Downs

Young squirrels are also vulnerable to being shaken out of trees in high winds, usually being killed or fatally injured by the fall. This may be one of the highest causes of deaths in juveniles and reports of dead red squirrels tend to increase after periods of stormy weather and gale or storm force winds.